The Personality Traits of Construction Management Professionals

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Construction management professionals (*CMPs*) make critical decisions regarding the competitive strategy, finance, markup, equipment, material, subcontractors, and so forth for their firms. Therefore, selecting the most suitable professionals for their roles is an essential part of good management, and every effort should be made to select the right persons for key construction positions. In addition to having the needed education, knowledge, and experience; CMPs should have the personality traits that assist them in performing their duties. For example, because CMPs continuously deal and communicate with many different individuals, the traits related to the desire and ability to work and deal with people are indispensable. Selection Resource Inc. (*SRI*) – a consulting psychology firm located in Toledo, Ohio – conducted pre-employment tests on applicants from many fields. The researchers were permitted access to thousands of pre-employment test reports, and they filtered them to 102 reports of experienced CMPs. The personality traits (47 factors) of these 102 applicants were compared to the overall population. The analysis suggests that CMPs were significantly different from the general population in 34 traits, and they were not significantly different in 13 other traits.

Keywords: Project Manager, Estimator, Personality Traits, Pre-employment Tests.

Introduction

Construction projects require the coordination of efforts of the owner, engineer, architect, sub-designers, construction management consultant, general contractor, subcontractors, and suppliers. The different priorities, motivations, personalities, and background of the representatives of these organizations complicate this coordination. Additionally, during the construction phase, many projects encounter unforeseen conditions or changes that require finding fair and acceptable resolutions and settlement. Construction management professionals (*CMP*) should have the personality traits that enable them to navigate and thrive in such an environment.

Personality is the unique organization of thoughts, feelings, and behavior combined distinctly in each person that defines and determines the person's pattern of interaction with the environment. The environment includes both human and nonhuman elements (organizational demands, work conditions, and physical environment). Trait is a continuous dimension on which individual differences may be measured by the amount of attributes the individual exhibits (Gatewood and Field, 2001). Temperament may be viewed as a biologically determined subset of personality. Character, however, may be better thought of as the person's adherence to the values and customs of the society in which he or she lives. Pre-employment tests are written examinations administered to prospective employees in addition to an interview during the hiring process to measure their personality traits. Such tests are usually accompanied by a face-to-face discussion, which is conducted by a consulting psychologist (Hacker, 1999). Researchers found that personality characteristics of many experienced workers seem to be essential for job performance (Gatewood and Field, 2001). Numerous research studies demonstrated that the personality traits or preferences are factors that influence the job performance of an employee (Carr, 2000). To avoid legal and ethical questions and disputes, human resource managers must identify the specifications needed for the employee who will fill the vacant position and the personality traits that meet these specifications before using personality traits in selection (Gatewood and Field, 2001). This paper attempts to define the range of personality traits of CMPs and identify the traits that differentiate them from the population at large; it also compares the personality traits of estimators and Project Managers (PMs).

Construction management students and professionals would benefit from the identification of the personal traits of CMPs. Students who are considering construction as a career can be guided regarding their suitability for the construction industry. Both construction students and CMPs can identify the personality traits that they need to enhance to increase their chances of success. If the individual's personality traits are matched with the needs of the job that he or she performs, both the employer and the employee will benefit. These matching benefits lead to increased job satisfaction and productivity and reduced turnover.

The most valuable resources for construction firms are their human intellectual assets especially at the upper and middle management. Many firms compete for the same pool of material, equipment, and subcontractors, and to a good extent, they may have equal opportunity to acquire these resources from the market. Material and equipment have specifications and performance compliance criteria that are more defined than human. Identifying and selecting the managers who match the needs of their firms is crucial to the survival and prosperity of the firm. Human resources researchers found that personality data, when gathered appropriately, were valid as an additional contribution for making selection decisions (Gatewood & Feild, 2001).

Personality Traits in the Construction Management Literature

In the construction management literature, there are few published works about the traits of CMPs. These few works focused primarily on the traits of CMPs who work for an owner, an architecture, and an engineering firm. There is almost no literature about the traits of CMPs who work for general contractors or subcontractors. This paper adds to the body of knowledge regarding the traits of CMPs who work directly for contractors.

Singh (2002) surveyed 51 construction and design engineers at the Hawaii State Department of Engineering Construction (*SDEC*) to assess their preferred modes of cognitive processing orientations. He found that construction engineers were predominantly left-brained; whereas design engineers were predominantly right-brained. This difference in orientation partially explained why the design and construction engineers in the same organization were unable to agree on issues concerning the implementation of drawings. Left hemisphere dominant engineers (construction engineers) desired more organizational changes than did their right hemisphere dominant counterparts (design engineers). Left-brained individuals are usually analytical; whereas right-brained individuals are usually holistic. The right-brain persons are spatial, visual, intuitive, psychic, instantaneous, and artistic. The left-brain persons are analytical, scientific, methodical, linear, timely, verbal, and logical (Singh, 2002).

Carr (2000) suggests that the team with participants who have diverse personality traits is more useful during the conceptual and schematic phase of the project than the team with homogeneous traits. The team with diverse traits is more suited to consider all aspects of the building and evaluate all potential solutions than is the team with homogeneous traits. These considerations and evaluations of all options are essential to successful conceptual and schematic phases. Once the design boundaries are defined, the homogeneous team is more efficient in carrying out the detailed design (Carr, 2000). The construction phase is similar to the detailed design phase in terms of defined boundaries, except when changes are encountered. Therefore, participants with homogeneous traits might be preferred in order to complete the project successfully; however, changes are almost unavoidable in most construction projects.

In the traditional project delivery, the systematic process of plan, design, construction, and occupancy are performed in sequence and by separate entities. During the construction phase of a project, representatives of the owner, architect/engineer, contractor, subcontractor, and so forth (with different backgrounds and conflicting interests) work together to finish the project on time and within budget according to the project specifications. Recently in the construction industry, there has been significant momentum for change in the way construction projects are completed. This traditional project delivery system is giving way to alternative approaches such as design-build. This approach, which consolidates groups of people who are traditionally responsible for separate functions in the project's delivery, is resulting in new forms of organizational structures and hierarchy. In order for such projects to be successful, it is essential that the participating organizations be staffed with CMPs who can work effectively with one another (Carr, Garza, and Vorster, 2002).

Research Methodology

Selection Resource (*SRI*), a consulting psychology firm located in Toledo, Ohio, conducted pre-employment testing services for many firms in different industries. Four successful construction companies with more than 400 employees each were among the clients of SRI. Two of them were listed among the "Top 600 Specialty Contractors" in the *Engineering News Record (ENR)* magazine, and another one was listed in the "Top 400 Contractors" in the ENR magazine (Tulacz & Powers, 2003). The applicants and the companies permitted SRI to use their data in a collective manner for research purposes. For each applicant, a psychologist conducted a battery of tests and summarized the tests in a personality assessment report. The research team filtered thousands of reports down to 206 reports of applicants to the following construction management positions: Estimator, Project Manager, Cost Engineer, Project Controls Manager, Field Project Manager, Superintendent, Department Manager, Project Coordinator, Project Engineer, Vice President, Scheduler, and Site Manager. The reports were further filtered to only 102 reports of applicants who had more than four years of construction experience. This criterion of four years of construction experience was guided by the Associate Constructor certification requirements by the American Institute of Constructors (Dumarcher, 2005).

The research team reasonably argued that the 102 reports were of established CMPs because they were pre-selected by their employer and they considered themselves qualified for these positions. Those 102 applicants had the education, knowledge, and experience to fulfill the needs of the vacant jobs because their employers reviewed their résumés and interviewed them. The employers sent for traits assessment only the applicants who met all the needed technical requirements for the positions, due to the cost associated with the assessment.

These research subjects were further divided into two groups: Estimators and PMs according to the positions, for which they applied and were considered. The PM group included project managers and superintendents. The objective of the grouping was to check the possibility of significant differences between the personality traits of the two groups. The numbers of subjects for the estimators and PMs groups were 18 and 58, respectively. The remaining 26 applicants applied for other positions or for both positions.

Evaluated Personality Traits

The 102 prospective employees were evaluated using the following eight pre-employment instruments: SRA Nonverbal Form, Kuder Career Search, Supervisory Index, How Supervise, Leadership Opinion Questionnaire, Sales Potential Inventory, NEO Prediction Indicator-Revised, and Teamwork. It took about five to six hours for a professional psychologist to complete the evaluation. Appendix 1 presents the description of the 47 personality traits derived from these instruments. These pre-employment instruments are reliable assessment tools that have been validated in different settings (E. Summons, personal communications, February 2005).

Statistical Analysis

The objectives of the statistical analysis were: (1) identify the personality traits of the CMPs and their subgroups of PMs and estimators, (2) test the hypothesis that there are significant differences between the personality traits of CMPs and that of the population at large, and (3) test the hypothesis that there are significant differences between the traits of estimators and those of PMs.

The personality traits for each applicant were measured against the average values of these traits for the population at large. For example, if an applicant was more assertive than the average person, he or she would score more than 50 (the assertiveness level of an average person) depending on the amount of exhibited assertiveness. The mean value of each trait for the population at large was 50; however, the standard deviation (*SDEV*) of the population at large was unknown. The simple sample two-tailed *t*-test was used to test the hypothesis that there were significant differences between the traits of CMPs and those of the population at large. ANOVA was used to test the hypothesis that there were significant differences between the traits of estimators and PMs because the SDEV for these groups were calculated from the collected data. The statistical analyses were performed with the probability of rejecting a tested statistical hypothesis when, in fact, that hypothesis was true (α) = 0.05 and degree of freedom (*df*) = 101.

Findings

Figure 1 summarizes the mean value for each trait (in comparison with the mean for the population at large) along with SDEV. Note that all the personality traits shown in Figure 1 have positive attributes except three traits: impulsiveness, angry hostility, and vulnerability. For positive traits such as conceptual ability, the higher the score, the better the trait; and the opposite is valid for negative traits. Note that the mean scores of the CMPs for these three negative traits were below those of the general population.
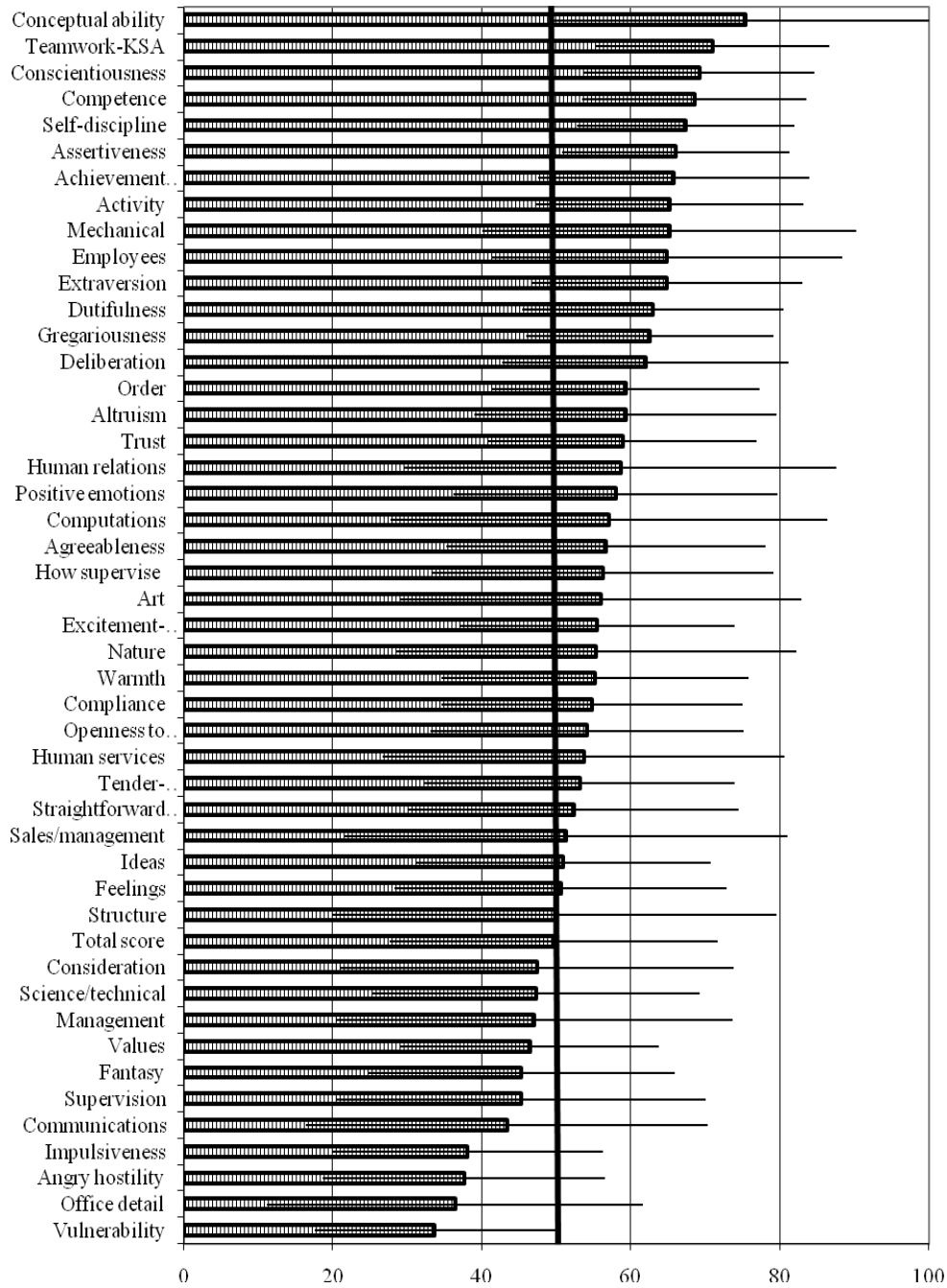
Figure 1: The mean value for each trait in comparison with the mean for the population at large (represented by the thicker solid line at 50) along with SDEV

The statistical analysis indicated that CMPs were significantly different from the general population in the following 34 personality traits: conceptual ability, teamwork-KSA, conscientiousness, competence, self-discipline, assertiveness, achievement striving, activity, mechanical, extraversion, employees, dutifulness, gregariousness, deliberation, order, altruism, trust, human relations practices, positive emotions, computations, agreeableness, supervisory ability, art, excitement-seeking, warmth, compliance, values, fantasy, supervision, communication, impulsiveness, angry hostility, office detail, and vulnerability. In contrast, they were not significantly different from the general population in the following 13 factors: management, science/technical, consideration, total score, structure, feelings, ideas, sales/management, straightforwardness, tender-mindedness, human services, and openness, nature.

Appendix 2 presents the mean and SDEV of the 47 traits for the PMs and Estimators. There were not significant differences between the personality traits of estimators and PMs except for following two factors: human services and gregariousness. The discrimination criteria for significant difference was the Pr value (shown in Appendix 2); there is significant difference if the Pr value is less than or equal to 0.05.

Conclusions

This research identified the means of the personality traits of CMPs. The research findings indicated that CMPs were significantly different from the general population in 34 traits and were not different in another 13 traits. The PMs and estimators groups were not significantly different in 45 traits and were significantly different in two traits: human services and gregariousness. It is suggested that estimators and project managers can switch jobs without personality constraints.

Selecting the most suitable employees for each job is essential for the success of every construction firm. In addition to having the needed knowledge, skills, and experience, CMPs should possess the personality traits that enable them to lead their firms successfully. The final decision to hire a candidate should be based on how the person collectively suits the job, not on a few personality traits. This research could be augmented and reinforced by replicating this study with a larger sample in different parts of the United States and the world to validate the above-cited findings. The larger sample should include more contractors of different sizes and specialties.

References

Carr, P. G. (2000). *An investigation of the relationship between personality traits and performance of engineering and architectural professionals providing design services.* PhD dessertation, Virginia Polytechnic Institute and State University. Blacksburg, Virginia.

Carr, P, Garza. J, and Vorster, M. (2002). Relationship between Personality Traits and Performance for Engineering and Architectural Professionals Providing Design Services. *J. of Management in Engineering*, Vol. 18, No. 4, pp. 156-166.

Dumarcher, T. (2005). Construction Management Professionnels: A Pattern of Traits. MIT thesis, Bowling Green State University, Bowling Green, OH.

Gatewood, R., & Feild, H. (2001). An introduction to selection. In J. Weimeister, and B. Bochenko (Eds.), *Human resource selection* (5th ed., pp. 16-17, 43-44). Mason, OH: South-Western.

Hacker, C. (1999). *In Pre-employment testing: The costs of bad hiring decisions and how to avoid them* (2nd ed., pp. 45-53). New York, Saint Lucie.

Singh, A. (2002) Behavioral perceptions of design and construction engineers. *Journal of Engineering, Construction and Architectural Management,* 9 (2), 66–80.

Tulacz, G., & Powers, M. (2003, May 19). The top 400 contractors. *Engineering News Record.*

Appendix 1

Interpretation of the personality traits (factors)

Instrument	Factor Description
Achievement striving	Aspiration levels.
Activity	Rapid tempo and vigorous movement.
Agreeableness	Altruism.
Altruism	Active concern for others.
Angry hostility	Tendency to experience anger and frustration.
Art	Interest in activities that make beauty.
Assertiveness	Dominance, forcefulness, and social ascendancy.
Communications	Interest in using language, either writing or speaking it.
Competence	The sense that one is capable, sensible, prudent, and effective.
Compliance	Deference to others in reaction to interpersonal conflict.
Computations	Interest in activities that use numbers.
Conceptual ability	Ability to learn job requirements within a reasonable time
Conscientiousness	Planning, organizing, and carrying out tasks.
Consideration	Ability to develop job relationships with subordinates characterized by mutual trust, respect, consideration, and warmth.
Deliberation	The tendency to think carefully before acting.
Dutifulness	Adherence to ethical principles and moral obligations.
Employees	Attitude toward the subordinates; knowing of their motivations and needs.
Excitement-seeking	Craving for excitement and stimulation.
Extraversion	Outgoingness.
Fantasy	Openness to fantasy.
Feelings	Openness to one's own inner feelings and emotions.
Gregariousness	Preference for other people's company.
How supervise	Supervisor's knowledge and insight concerning human relations in industry
Human relations	Supervisor's techniques to handle problems, lateness, apathy, arguments.
Human services	Interest in helping other people.
Ideas	Intellectual curiosity.
Impulsiveness	Inability to control cravings and urges.
Management	Feeling toward top management, pay, company policy, benefits, plant regulations, and other aspects over which the supervisor has little control.
Mechanical	Interest in knowing how things work and using tools to make or repair things.
Nature	Interest in outdoor activities, such as growing or caring for plants or animals.
Office detail	Interest in keeping track of things, people, or information.
Openness	Willingness to try different activities.
Order	Characteristics of organization.
Positive emotions	Tendency to experience positive emotions.
Sales/management	Interest in dealing with people, such as leading a team of workers or selling ideas.
Science/technical	Interest in discovering or understanding the natural or physical world.
Self-discipline	The ability to begin tasks and carry them through to completion.
Straightforwardness	Frankness, sincerity, and ingenuousness.
Structure	Ability to define a person's own role and those of subordinates to achieve goal.
Supervision	Attitude toward the duties and responsibilities of a supervisor; a person's annoyances, desires, and needs; and feelings toward other supervisors.
Teamwork-KSA	Knowledge, skills, and abilities (KSAs) that predict ability to work in teams.
Tender-mindedness	Attitudes of sympathy and concern for others.
Total score	Individual's attitude about being a supervisor.
Trust	Disposition to believe that others are honest and well intentioned.
Values	Readiness to reexamine values.
Vulnerability	Vulnerability to stress.
Warmth	Issues of interpersonal intimacy.

Appendix 2

The mean and SDEV for each factor for the two groups

Factors	Estimator		PM		Pr
	Mean	SDEV	Mean	SDEV	Value
Conceptual ability	82.39	26.30	78.29	18.08	0.37
Nature	50.82	30.36	57.74	4.24	0.31
Mechanical	69.82	20.22	65.09	18.34	0.74
Science/technical	43.82	28.96	45.98	4.95	0.24
Art	66.41	30.08	56.36	4.24	0.10
Communication	42.12	27.05	41.43	2.83	0.32
Human services	38.94	27.08	60.34	7.78	0.00
Sales/management	46.24	26.83	50.29	11.31	0.38
Computations	64.35	26.70	52.21	27.30	0.19
Office detail	39.82	23.98	34.21	1.41	0.55
Total score	41.71	28.34	50.08	2.12	0.52
Management	45.24	29.59	47.28	2.12	0.88
Supervision	38.09	18.91	46.82	9.19	0.51
Employees	62.65	24.35	64.83	5.20	0.98
Human relations practices (h)	47.09	32.02	58.70	22.65	0.19
Supervisory ability	49.71	26.28	56.15	38.73	0.41
Consideration	53.82	27.20	44.63	36.35	0.29
Structure	51.76	21.04	49.91	0.71	0.98
Angry hostility	34.65	24.32	38.16	6.36	0.68
Impulsiveness	31.88	30.57	37.12	16.92	0.15
Vulnerability	34.29	31.53	35.96	11.31	0.15
Extraversion	66.00	22.72	61.86	11.31	0.11
Warmth	57.82	28.52	52.21	8.96	0.31
Gregariousness	71.47	30.19	59.74	12.66	0.05
Assertiveness	67.06	23.09	64.95	8.49	0.44
Activity	66.18	27.98	63.05	4.51	0.08
Excitement-seeking	51.24	26.63	55.70	17.95	0.80
Positive emotions	55.65	17.83	55.40	27.87	0.24
Fantasy	46.88	28.02	44.63	5.66	0.89
Feelings	44.88	25.63	49.68	6.36	0.37
Openness to new activities	52.53	25.06	53.86	1.41	0.91
Ideas	56.47	21.56	47.79	2.83	0.14
Values	44.47	32.92	46.37	25.06	0.97
Agreeableness	56.94	31.82	56.93	11.93	0.85
Trust	62.06	29.16	57.04	7.77	0.40
Straightforwardness	47.65	27.30	55.67	9.90	0.45
Altruism	65.35	30.89	55.54	11.31	0.12
Compliance	51.24	25.64	57.86	12.50	0.24
Tender-mindedness	57.06	35.57	50.37	6.11	0.40
Conscientiousness	72.00	32.94	67.26	0.71	0.19
Competence	69.82	21.13	66.16	3.54	0.08
Order	56.71	26.76	59.42	12.58	0.66
Dutifulness	70.53	28.30	60.68	0.71	0.07
Achievement striving	65.88	21.58	64.14	17.78	0.13
Self-discipline	68.88	24.32	65.07	2.89	0.12
Deliberation	67.88	32.22	61.18	7.77	0.29
Teamwork-KSA	69.11	26.43	73.68	6.51	0.77